ARISE

Advanced AI and RobotIcS for autonomous task pErformance

Powering Up Agriculture and Green Energy with AI and Robotics

Current Challenges

- Improve productivity and supply chain efficiency related to tasks in hazardous conditions such as harvesting.
- Safeguard health and safety minimising the long-duration tasks of human-workers.
- Maximise the human-robot interaction in order to collaborate in everyday working environments.
- Develop robots that can perform a variety of tasks to fill in labour shortages.
- Enhance data collection and analysis during robotic operation to improve decision-making.
- Mimic human senses and make intelligent decisions from various inputs.
- Enhance investment in AI-powered applications and assess the return of investment.
- Enable scalability of AI-driven robotics encouraging business organisations to integrate novel technologies.
- Address EU's 2030 Climate Target Plan to increase energy efficiency and create green jobs.

Targeted Industrial Applications

ARISE toolchain will be tested on five Use Case Scenarios (UCS) within the Energy and Agriculture sectors:

Solar panel installation and repair

1. Navigation along the solar panel row, identifying backsheet cracks and deploying repairs.
2. Navigation and Rack Bolt fastening.
3. Picking up and carrying a solar panel in collaboration with a human worker.

Hydroponic lettuce transplanting and harvesting

1. Lettuce transplanting.
2. Lettuce harvesting.

Arise Technologies

- Two reconfigurable pneumatic-based robotic manipulators
- Novel soft end-effectors with variable stiffness
- A Robotic perception module comprising 3D vision algorithms
- A Localisation and Mapping module
- A Semantic Mapping module powered by scene-understanding algorithms
- A Knowledge Representation Framework
- A Hierarchical Imitation Learning Framework
- A Human-Interaction conditioned Path and Task planning module
- An edge-AI framework for deploying Machine Learning models and computer vision algorithms
- Two demonstrators in solar and hydroponic farms
- Contributions to the AI-on-demand platform packages

Consortium

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